# Transportation Knowledge Networks

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**Washington State
Department of Transportation**

# Challenges

- Increasing retirements
- Changing demographics
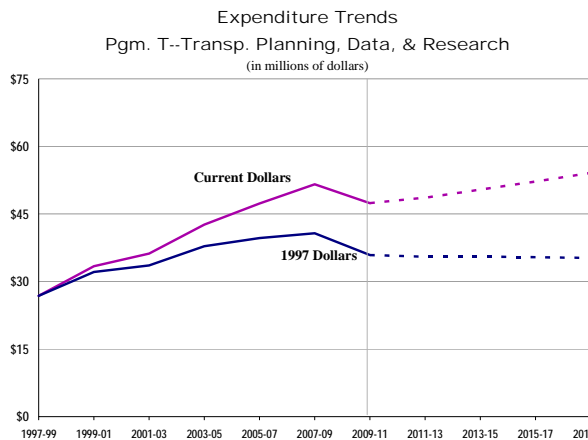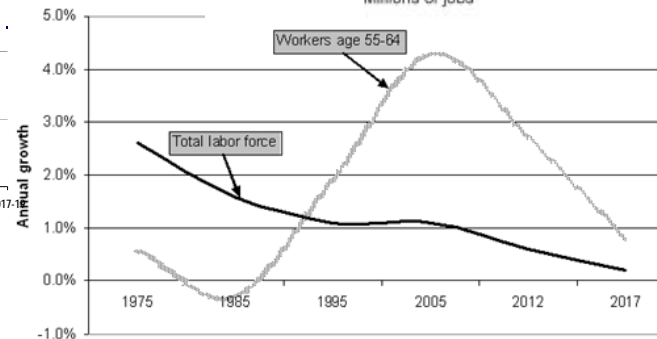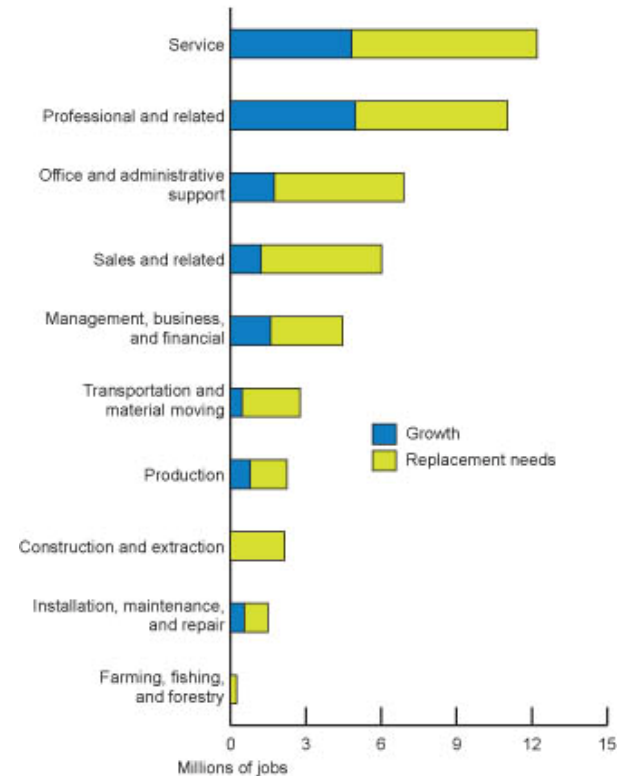- Unique knowledge
- Doing more with less

Chart 10. **Number of jobs due to growth and replacement needs by major occupational group, projected 2006-16**

*Occupational Outlook Handbook, 2008-09 Edition*

**Expenditure Trends**
**Pgm. T--Transp. Planning, Data, & Research**
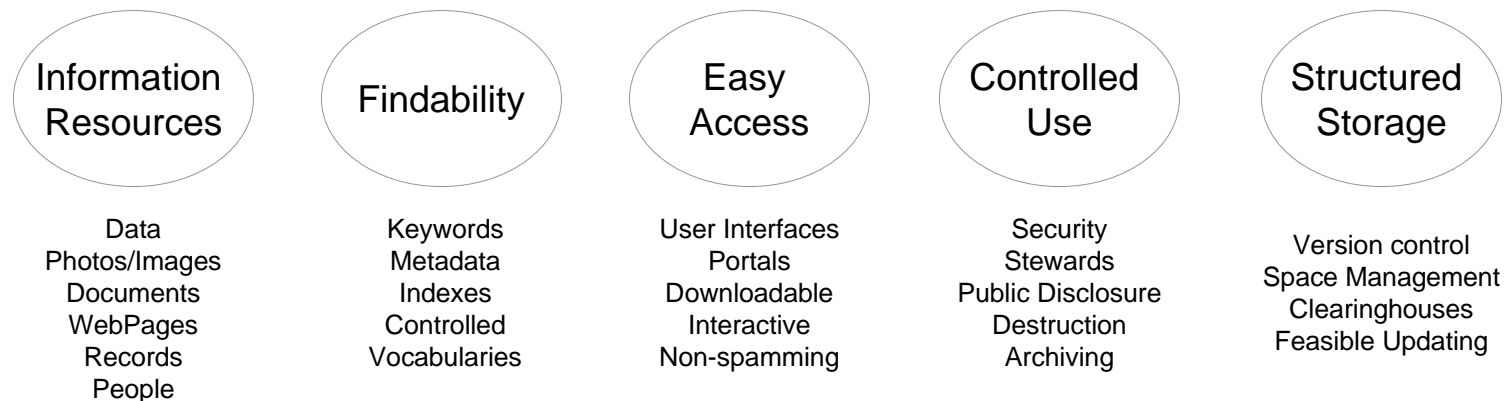(in millions of dollars)

2

# What is Knowledge Management?

- The systematic processes by which knowledge needed for an organization to succeed is created, captured, shared, and leveraged.

  *The Complete Idiot's Guide to Knowledge Management*

- Getting people the information they need, in the form they need it, when they need it.

| Information Resources | Findability | Easy Access | Controlled Use | Structured Storage |
|---|---|---|---|---|
| Data<br>Photos/Images<br>Documents<br>WebPages<br>Records<br>People | Keywords<br>Metadata<br>Indexes<br>Controlled<br>Vocabularies | User Interfaces<br>Portals<br>Downloadable<br>Interactive<br>Non-spamming | Security<br>Stewards<br>Public Disclosure<br>Destruction<br>Archiving | Version control<br>Space Management<br>Clearinghouses<br>Feasible Updating |

# Types of Knowledge

*What individuals know*
*Know how to do*

*Relationships between*
*individuals/within groups*

**HUMAN**

**SOCIAL**

*Explicit*
Can write
down

*Tacit*
Don't
know
you know

**STRUCTURAL**

**CULTURAL**

*Embedded in systems,*
*processes, tools & routines*

*Collective understanding*
*of how things are done*

4

# A Knowledge Retention Culture

**Human Resources**
Risk identification
Succession planning/career
development processes
Building a retention culture
Policies to retain workers

**Information Infrastructure**
Technologies that intensify
collaboration
E-learning applications
Support for problem solving
Findability
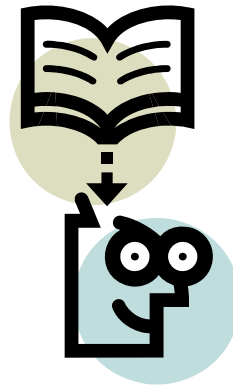
**Knowledge Transfer**
Documentation
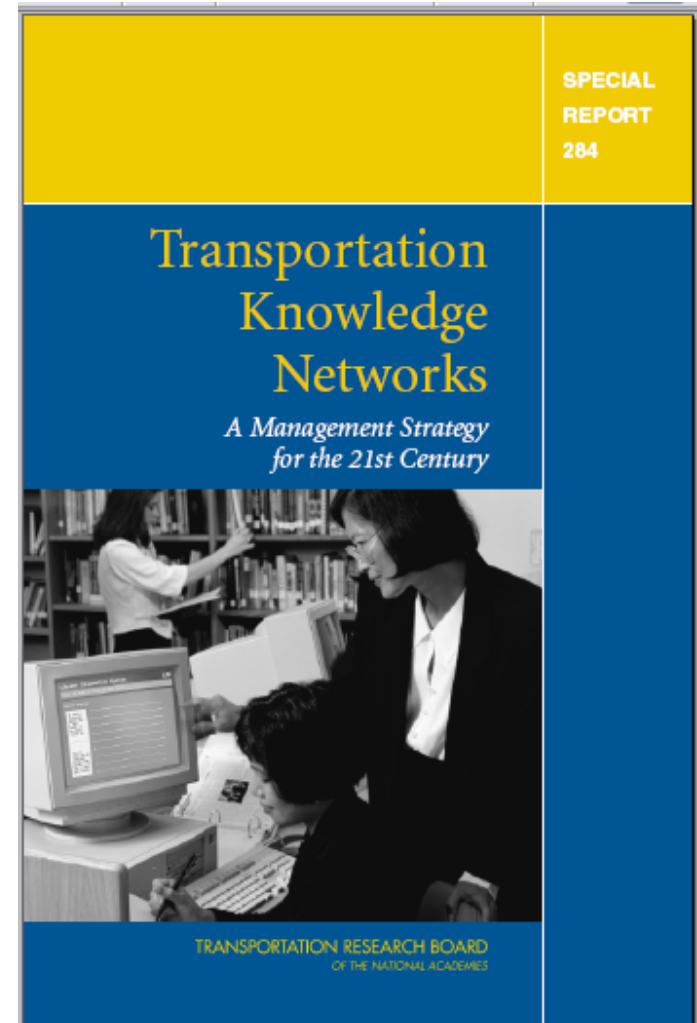Interviews/Debriefing
Training
Social Networks

**Knowledge Recovery**
Using retirees effectively
Outsourcing
Regenerating knowledge

# TRB Special Report 284

## Recommendations

- Proposed a network of Transportation Knowledge Networks with a National Coordinating Structure

- Need for a strong governing body to provide policy, oversight, and advocacy

- Seek broad-based funding support to sustain operations.
  - Provide federal grants for start up
  - Grow federal funds
  - Develop local match

http://onlinepubs.trb.org/Onlinepubs/sr/sr284ReportSummary.pdf



SPECIAL REPORT 284

Transportation Knowledge Networks

*A Management Strategy for the 21st Century*

TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

Transportation Research Board of the National Academies 2006

# The Vision for Information

**An employee, working at their desk needs information they don't have…**

- Because of good marketing in the agency, they know where to turn to get the information.

  - They open their Internet browser to the Information portal and find a user-friendly menu of options.

  - They choose the service they are looking for such as a literature review; facts on file; agency templates; access to a database; etc…
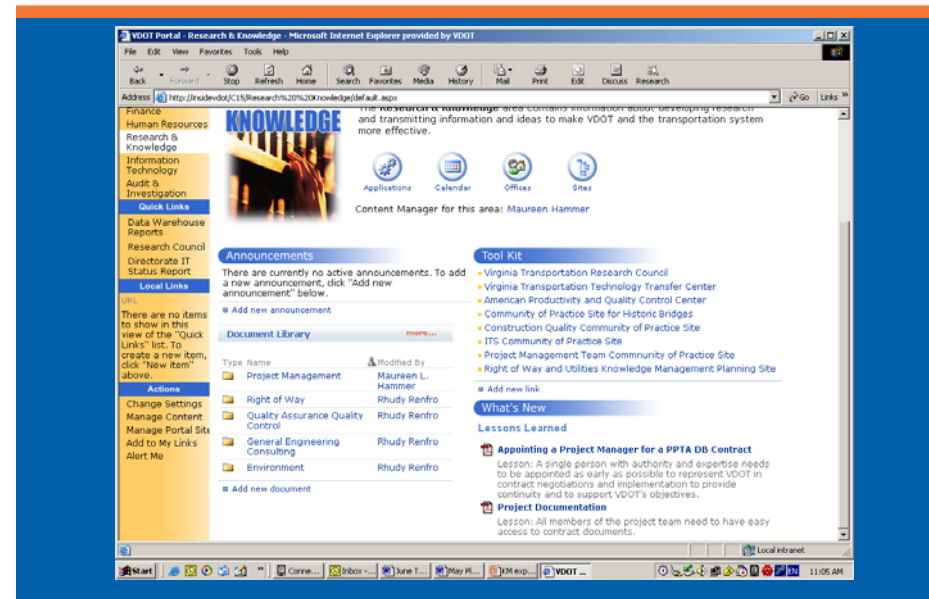
# The Employee finds a User-Friendly Portal

- If they are searching for documents or data, the front end application asks them how they want to search for information –
  - geographically, topically, by title/author, or other formats.
  - This interface is visually engaging and easy to use.
  - With a click, they are taken to that search tool/aid (or they are all on the first page).
  - They type in their search phrase or point and click to icons and retrieve information. The databases/systems which are being searched is not belabored but are noted while the search is underway (Now searching BIOSIS...)



*Cooperating Libraries of Olympia, listing*



*WSDOT Traveler Information System*

# The Portal Tools Help Refine the Search

- Can select output: narrative, tabular, geospatial data, or all. To help refine the search questions our librarians typically ask are programmed into the system.

- The results are provided in good English without cryptic abbreviations.

- When the site includes data references, the data platform, relevant uses, authorized users are identified.

- Once they find the data they want, they can save information under a custom account.

# Information is Accessible

- Documents/data can be retrieved by point and click on the retrieved search list and the application highlights the specific text relevant to their search.

  - Because the documents and data are tagged, they are able to find specifically what they're looking for.

  - The behind the scenes effort to obtain, catalog, index/tag, store information is not obvious.

- The employee is able to pull quotes for the documents with prompts to help them understand copyright laws and appropriate uses/references.

# Most of the Time…

- If a document is not available electronically, the user is offered a menu for delivery
  - Interlibrary loan

  - Electronic document deliver

  - Purchase of paper copies

This document is available to the public through the National Technical Information Service, Springfield, VA 22616.

# Special Report 284

## Next Steps

- Develop a business plan

- Determine which office should manage the coordinating structure.

- Provide a strong governance body for the coordinating structure.



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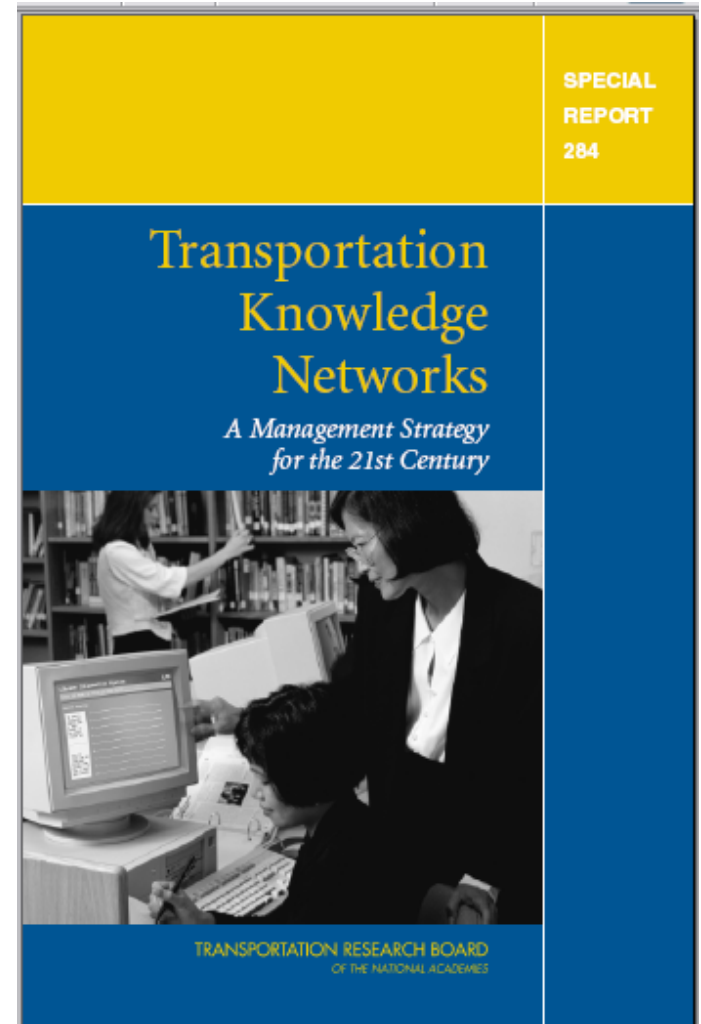
# Implementing Transportation Knowledge Networks (NCHRP 20-75)

- Follow up project funded in 2007
- Creates a business plan that:
  - Frames the problem
  - Describes potential solutions
  - Helps communicate the value of a Transportation Knowledge Network
- Principal Investigator:
  - Frances Harrison, Spy Pond Partners
  - http://www.cts.umn.edu/Research/Featured/NCHRP20-75/

# AASHTO Standing Committee on Highways

A survey of SCOH members was conducted in May of 2008. **85% of the respondents thought a TKN would add value for transportation agencies**.

| Do you think that a transportation knowledge network/information portal would add value for transportation agencies? | | |
|---|---|---|
| Yes | 85.2% | 23 |
| No | 0.0% | 0 |
| Don't Know | 14.8% | 4 |
| If you answered No or Don't Know, please explain: | | 4 |

| If a national transportation information portal were created, what types of content would be useful for the scope of responsibilities you manage? | | |
|---|---|---|
| Industry Standards and Guidelines | 59.3% | 16 |
| Current Policies and Procedures | 81.5% | 22 |
| Data sources | 48.1% | 13 |
| Directory of transportation professionals across the nation | 63.0% | 17 |
| Research reports | 74.1% | 20 |
| State of the practice/Lessons Learned resources | 88.9% | 24 |
| Key transportation facts (gas tax by state, which states are using | 96.3% | 26 |
| Event data (national and regional meetings and conferences) | 33.3% | 9 |
| Other (please specify) | | 1 |

14

# Key Findings – Desired TKN products & services

- One stop shopping for transportation information
- Improved search tools
- Value-added services to filter & annotate information (address information overload)
- Peer-to-peer sharing of best practices
- Capture of "missing" information resources
- Greater access to digital documents
- Cataloging to enable sharing of documents across organizations
- Preservation of information resources to ensure continuing availability

# Key Findings
## Recommended Approach to Implementing TKNs

- Employ a mix of strategies – no single element alone will be effective

- Emphasize role of the National coordination function, clarify role of the regional TKNs

- Use "hot topics" and innovation to demonstrate value

- Emphasize efficiency benefits

- Incorporate both centralized and decentralized elements

- Establish clear accountability

# NCHRP 20-75 Business Plan

- **Context Section**
- **Background**
- **Mission, Goals and Objectives**
- **Market**
- **Products and Services**
- **Stewardship Model**
- **Costs** – $13.5 million per year
  - $7.9 mill for content
  - $3.1 mill technical/administrative infrastructure
  - $1.5 mill outreach/education
  - $1 mill research/literature review services
- **Funding Source**

http://www.cts.umn.edu/Research/Featured/NCHRP20-75/businessplan.html

# Overview of TKN Products & Services

## Transportation Information Portal
**(provided by national TKN coordination function** — **components available for incorporation into other web pages)**

| Find Information | Ask a Question | Event Calendar | Find a Person | News | Transportation Topics | Submit a Resource | Research in Progress | Communities of Practice |
|---|---|---|---|---|---|---|---|---|

## Information Resources & Tools
**(Responsibility for coordination, contributions and maintenance** — **shared across TKNs /Information Providers)**

| US DOT RITA, Modal Admins | TRB (TRIS, RiP, Needs) | State DOTs | MPOs | Universities | Library Resources OCLC, TLCat, First Search |
|---|---|---|---|---|---|
| Other Federal Agencies | AASHTO | | Local Jurisdictions | Industry, Non-Profits | |
| GIS Data | Tabular Datasets | Standards & Guidelines | Manuals | Directories | Images & Video |
| Tutorials | Legislation | Lessons Learned | Events | Performance Data | Commercial Databases |

## Knowledge Services & Protocols
**(Resource archiving, digitization, cataloging, bulk purchasing, interlibrary loan)**

## Standards & Crosswalks
**(metadata, thesaurus, taxonomy)**

18

# The TKN Ten Products and Services

1. National Digital Repository
2. National Print Repository
3. National Transportation Portal with Federated Search
4. Information Modules
5. Research/Literature Review Services
6. Standards Coordination & Thesaurus
7. Targeted Collection & Digitization Efforts
8. Information Provider Outreach, Coordination and Communication
9. Library Connectivity Support and Advocacy
10. User Outreach & Education

# Recommended Next Steps

1. Continue broad outreach

2. Continue to expand the communications toolkit

3. Use NCHRP (20-75A) *Directory of Transportation Libraries and Information Centers* - to extend the TKN and awareness of the TKN initiative.

4. Encourage state champions to meet with senior management to brief them on the TKN initiative and its potential benefits

# More from NCHRP 20-75

One-page summary of project

Listen to testimonials

View & Listen to an overview presentation as a PDF

And much more:

http://www.cts.umn.edu/Research/Featured/NCHRP20-75/

# *Transportation Knowledge Networks*

**RITA** — U.S. Department of Transportation | Research and Innovative Technology Administration
**National Transportation Library**

http://ntl.bts.gov/networking/national.html



**Midwest**
**TKN**
**9 States**
**15 Orgs**

**Western**
**TKN**
**9 States**
**16 Orgs**

REGION 1
REGION 3
REGION 4
REGION 2

**Eastern**
**TKN**
**6 States**
**13 Orgs**

22

# AASHTO Research Advisory Committee on Transportation Knowledge Networks Task Force

## Goal

Serves as a forum to develop the concept, understanding, and application of transportation knowledge networks for the transportation sector. The AASHTO RAC TKN TF advocates and supports the rapid and efficient exchange of information resources through development of strategies and the innovative use of technology.

# Task Group Membership

1. AASHTO RAC Region 1 – 2 members (Massachusetts & Vacant)
2. AASHTO RAC Region 2 – 2 members (Virginia & Louisiana)
3. AASHTO RAC Region 3 – 2 members (Kansas & Wisconsin)
4. AASHTO RAC Region 4 – 2 members (Washington & Oklahoma)
5. Research and Innovative Technology Administration, National Transportation Library
6. Federal Highway Administration
7. Transportation Research Board
8. Council University Transportation Center
9. Special Library Association Transportation Division
10. Eastern TKN
11. Midwestern TKN
12. Western TKN
13. TRB Committee on Library and Information Science for Transportation

# TKN TF Goals

1.  Support the formation of the transportation knowledge network to address business needs.

2.  Advocate for an effective TKN and supporting information infrastructure.

3.  Enhance knowledge exchange within the transportation community.

4.  Develop strategies to actively monitor, support, and encourage methods for effective creation, capture, synthesis, transfer, application, and preservation of transportation knowledge.

# TKN TF 2009 Activities

1) Articulate the concept and value of knowledge networks and quality library and information services.

   - Before and after descriptions

2) Explore and Advocate for sustained funding.

   - AASHTO Reauthorization request

3) Describe a successful TKN model for transportation, including definitions of best practices.

4) Develop strategies to capture knowledge and retain institutional memory from retiring and other departing employees.

# How Can AASHTO IS Help?

- Participation in building the vision
  - Best technology and data strategies
  - Metadata
- Advocacy
- Joint leadership?
- Success stories – ROI
- Work the vision
- Other ideas?

# A Special Note on Findability

- Not easy to find the information.
- Internet searches only access ~16% of available information resources
- Full text searching doesn't find most related terms
- Version control management challenges
- "Hidden" communities

# How Do We Compare?

- **National Library of Medicine**
  - MeSH 23,000 terms,
  - >150K supplementary records, thousands of cross references
  - 11 staff managing the thesaurus
  - Index over 4800 professional journals
  - PubMed and MedLinePlus
- **National Agricultural Library**
  - NALT >68,500 terms
  - 7 staff managing the thesaurus
  - Have indexed over 4 million records
  - Custom user interfaces
- **National Transportation Library**
  - TRT <10,000 terms
  - Indexing is a part time duty between 4 FTE
  - 600,000 records in TRIS
  - Very limited customer user interfaces

Annual Library Budget
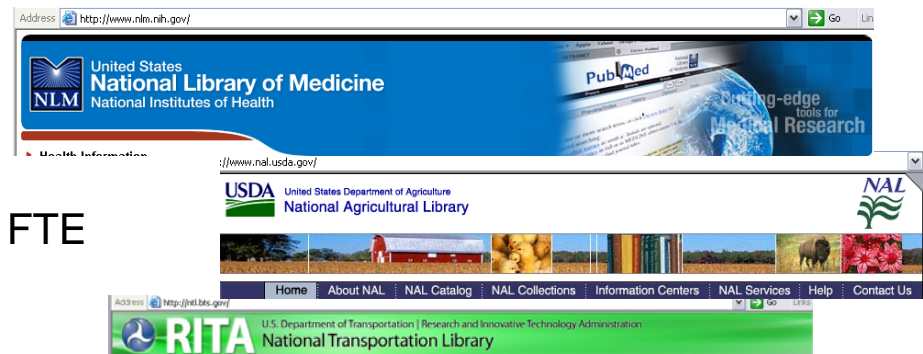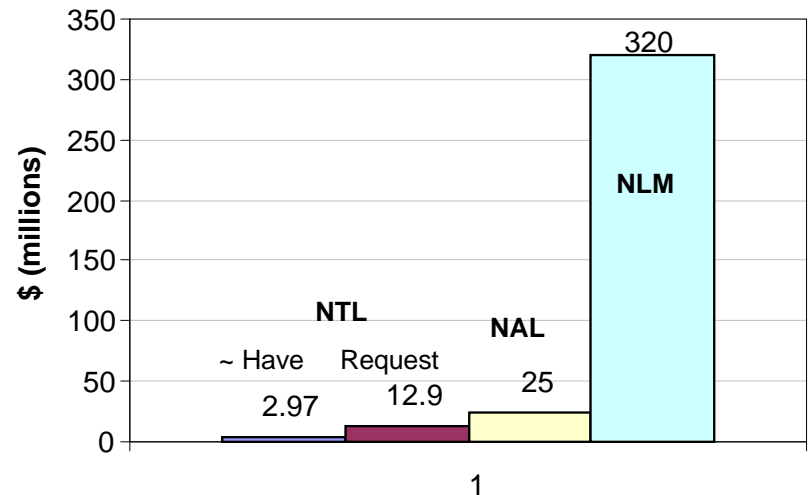
# Metadata & the TRT

While we're waiting for the semantic web…

- Common metadata to help us find relevant, related information regardless of source
- Uses & limits of "machine language"
- Common language

*"I am hoping that someday a portal would be developed that would prompt the user for keywords AND decisions which would help to refine the quest into a more defined and narrow search."*

| ORGANIZATIONAL |
| CATEGORICAL |
| JURISDICTION or LOCATION |
| JUSTIFICATION |
| COMPLIANCE |
| TIME or SCHEDULE |
| DELIVERABLES/ RESOURCES/TOOLS |

# Why Add Library Science?

- Standards for vocabulary and data definitions (ISO -11179 Metadata Repositories, ANSI/NISO Z39.19-2005)

- Experience describing information and documenting it

- Familiarity with user queries

- Familiarity with search techniques and experiences

- Centuries of knowledge development

# Reauthorization

AASHTO Standing Committee on Research and CEO Board of Directors approved a recommendation for reauthorization to establish a Transportation Knowledge Network

– Facilitate the development and implementation of Transportation Knowledge Networks

– Broaden the mission of the National Transportation Library

– Establish an advisory committee on transportation information
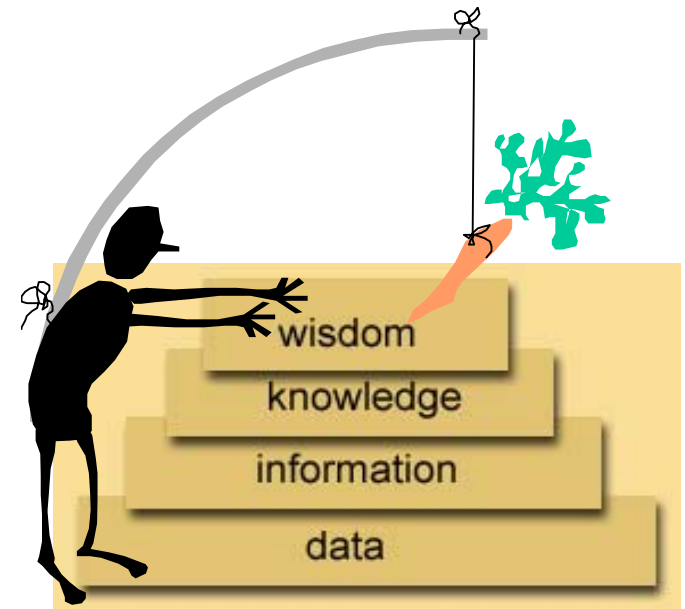
– Proposed Funding Level:  $13.5 million per year

AASHTO Reauthorization request

# The Time _is_ Right

With revenues tightening efficient access to information is even more important.

– Saves time
– Saves money
– Improves decision support
– Helps us communicate with constituents

**Wisdom:**  The capacity to choose worthwhile objectives

**Knowledge:**  The ability to use information to achieve objectives

**Information:**  Structured data

**Data:**  Pure and simple facts

http://www.systems-thinking.org/dikw/dikw.htm

# Resources

- Federal Knowledge Management Working Group
  http://wiki.nasa.gov/cm/wiki/?id=1926

- AASHTO RAC TKN Task Force
  http://cms.transportation.org/?siteid=55&pageid=2449

- *Lost Knowledge: Confronting the Threat of an Aging Workforce*
  David W. DeLong

- *Ambient Findability: What We Find Changes Who We Become*
  Peter Morville

- *Complete Idiot's Guide to Knowledge Management*
  Melissie Clemmons Rumizen

- *Driving Results Through Social Networks: How Top Organizations Leverage Networks for Performance and Growth*
  Rob Cross and Robert J. Thomas

# Contact Information

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